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Inside This Issue

JACC WHITE PAPER

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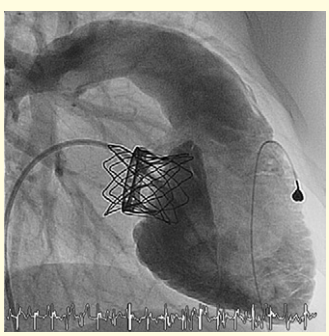
Early reperfusion therapy for stroke is associated with better patient outcomes; however, the majority of patients with acute ischemic stroke (AIS) do not receive any reperfusion therapy. White and colleagues review the currently recommended treatment algorithms for AIS. They postulate that catheter-based therapy for AIS may improve rates of reperfusion without increasing the incidence of intracerebral hemorrhage. These strategies include emboli removal devices, intra-arterial thrombolytics, and stenting. None of these interventions are currently widely available, and they suffer from a dearth of clinical trial data. Ultimately, improving AIS outcomes requires patient education to foster early presentation, expanding the number of hospitals and providers offering catheter-based treatments emergently, and data to match patients with their best option for reperfusion therapy.

CLINICAL RESEARCH



INTERVENTIONAL CARDIOLOGY

Roberts and colleagues collected data from several institutions regarding situations where the Melody percutaneous pulmonary valve (Medtronic, Minneapolis, Minnesota) had been implanted in the tricuspid position. A total of 15 cases were analyzed, all of which had prior tricuspid valve (TV) surgery but now had significant stenosis and/or regurgitation of a bioprosthetic TV or a right atrium-to-right ventricle conduit. Procedural success was achieved in all 15 subjects, with a significant reduction in the mean tricuspid gradient and reduction of regurgitation to mild or none. Complications included atrioventricular block requiring pacemaker insertion in 1 case and endocarditis 2 months post-implant in another patient. Patients with prior TV surgery may be candidates for percutaneous TV replacement.

Editorial Comment: John W. Moore, p. 123

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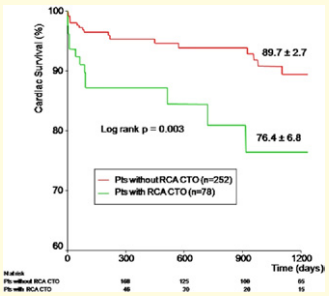
INTERVENTIONAL CARDIOLOGY

Pre-Existing RCA Occlusion Increases Risk of Left Main PCI 125

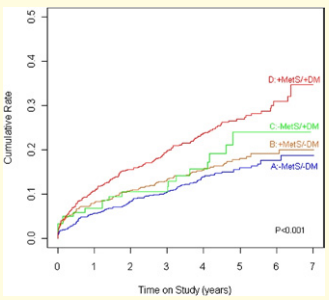


Angela Migliorini, Renato Valenti, Guido Parodi, Piergiovanni Buonamici, Giampaolo Cerisano, Nazario Carrabba, Ruben Vergara, David Antoniucci

Migliorini and colleagues investigated whether pre-existing right coronary artery (RCA) chronic total occlusion (CTO) increased the procedural risk in patients undergoing percutaneous coronary intervention (PCI) for unprotected left main disease (ULMD). Of 330 patients, 24% had CTO of the RCA. The 6-month mortality rate was 13% in patients with RCA CTO compared with 3.6% in patients without RCA CTO. By multivariable analysis, the only 2 independent predictors of 3-year cardiac mortality were RCA CTO (hazard ratio: 2.15) and EuroSCORE. RCA CTO causes patients undergoing ULMD PCI to be twice as likely to die within 6 months after the procedure.

ATHEROSCLEROTIC CARDIOVASCULAR DISEASE

Components of MetS Increase Risk in Stable CAD Patients 131



David J. Maron, William E. Boden, John A. Spertus, Pamela M. Hartigan, G. B. John Mancini, Steven P. Sedlis, William J. Kostuk, Bernard R. Chaitman, Leslee J. Shaw, Daniel S. Berman, Marcin Dada, Koon K. Teo, William S. Weintraub, Robert A. O'Rourke, for the COURAGE Trial Research Group

Maron and colleagues used data from the COURAGE (Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation) trial to determine if the metabolic syndrome (MetS) influences the prognosis of patients with coronary artery disease (CAD). In a post-hoc analysis, the incidence of death or myocardial infarction (MI) in stable CAD patients was twice as high in those with both MetS and diabetes mellitus (DM) compared with those with neither MetS nor DM. MetS was associated with an increased risk of death or MI, but this relationship was no longer significant after adjusting for the individual components of MetS. In stable CAD patients, the presence of MetS identified increased risk for death or MI, but did not have independent prognostic significance after adjusting for its constituent components, results not affected by randomization to optimal medical therapy or revascularization.

Editorial Comment: Thomas E. Kottke, p. 138

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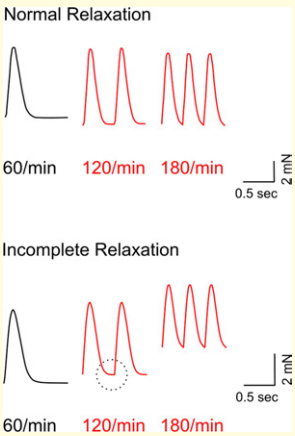
ATHEROSCLEROTIC CARDIOVASCULAR DISEASE

Joseph Yeboah, Alain G. Bertoni, David M. Herrington, Wendy S. Post, Gregory L. Burke

The association among impaired fasting glucose (IFG), incident type 2 diabetes mellitus (T2DM), and cardiovascular (CV) events remains unclear. This relationship was investigated in almost 7,000 subjects from MESA (Multi-Ethnic Study of Atherosclerosis). During 7.5 years of follow-up, T2DM was associated with a 2.8 times higher risk of CV incidence. IFG was associated with a 13 times higher risk of developing T2DM, and a higher risk of CV events after univariate adjustment, but not in the full multivariable model. These results confirm that many patients with IFG will develop T2DM and that T2DM predicts a higher risk of CV events suggesting a need for intervention in patients with IFG.

DIASTOLIC DYSFUNCTION



Donald E. Selby, Bradley M. Palmer, Martin M. LeWinter, Markus Meyer

Tachycardia can induce heart failure symptoms in otherwise asymptomatic patients. Selby and colleagues investigated the effects of tachycardia on myocardial contractility and relaxation in myocardial biopsies obtained from patients with normal ejection fraction undergoing cardiac surgery. Myocardial strip preparations were electrically paced at rates from 60 to 180 beats/min. One-half of the preparations developed incomplete relaxation with increased diastolic tension during tachycardia, while the other one-half did not. Incomplete relaxation was found to be associated with increased left ventricular (LV) mass and left atrial volume. These observations may play a role in reduced exercise tolerance and tachycardia-induced diastolic dysfunction in patients with LV hypertrophy.

Editorial Comment: Michael R. Zile, William H. Gaasch, p. 155

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HEART RHYTHM DISORDERS

Epicardial Ablation of Rotors Suppresses Inducibility of AF in Experimental Model **158**

Chung-Chuan Chou, Po-Cheng Chang, Ming-Shien Wen, Hui-Ling Lee, Tse-Ching Chen, San-Jou Yeh, Delon Wu

Micro–re-entrant wavefronts, also known as rotors, may be the source of rapid activations that propagate atrial fibrillation (AF). Chou and colleagues performed high-density optical mapping on Langendorff-perfused left pulmonary vein (PV)-left atrium (LA) preparations to test the hypothesis that radiofrequency ablation (RFA) of the re-entry anchoring sites would prevent AF inducibility. Rotor anchoring was found at the left superior PV-LA junction in 13 preparations. Epicardial rotor ablation successfully inhibited the inducibility of sustained AF in 12 of 13 preparations. These results help us to understand the importance of focal micro–re-entrant wavefronts for the inducibility of AF.

HEART RHYTHM DISORDERS

Syncope Due to Idiopathic Paroxysmal AV Block **167**

Michele Brignole, Jean-Claude Deharo, Luc De Roy, Carlo Menozzi, Dominique Blommaert, Lara Dabiri, Jean Ruf, Regis Guieu

Brignole and colleagues present data on 18 patients with syncope due to paroxysmal atrioventricular (AV) block unexplainable in terms of currently known mechanisms. All patients had: 1) normal baseline standard electrocardiogram; 2) absence of structural heart disease; and 3) paroxysmal third-degree AV block resulting in syncope with abrupt onset and no other rhythm disturbances before or during the block. The mean age was 55 years, and patients had suffered from recurrent unexplained syncope for 8 ± 7 years. AV block occurred without P-P cycle lengthening or PR interval prolongation. During the observation time, no patient developed permanent AV block; on permanent cardiac pacing, no patient had further syncopal events. Syncope due to idiopathic paroxysmal AV block is characterized by a long history of recurrent syncopes, absence of progression to persistent forms of AV block, and efficacy of cardiac pacing therapy.

Editorial Comment: Niraj Mehta, Maria Zildany Pinheiro Tavora, Carlos A. Morillo, p. 174

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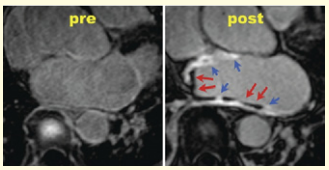

CARDIAC IMAGING

Early Dark Regions of LGE After AF Ablation Correlate With Later Areas of Scar **177**

Christopher McGann, Eugene Kholmovski, Joshua Blauer, Sathya Vijayakumar, Thomas Haslam, Joshua Cates, Edward DiBella, Nathan Burgon, Brent Wilson, Alton Alexander, Marcel Prastawa, Marcos Daccarett, Gaston Vergara, Nazem Akoum, Dennis Parker, Rob MacLeod, Nassir Marrouche

Success rates for atrial fibrillation (AF) catheter ablation vary significantly, in part due to limited information about the location, extent, and permanence of ablation injury at the time of procedure. McGann and colleagues report on acute ablation injuries seen on late gadolinium enhancement (LGE) magnetic resonance imaging (MRI) immediately post-ablation (IPA) and compared with 3 months post-ablation (3moPA). The acute left atrial (LA) wall injuries on IPA scans were categorized as hyperenhancing (HE) or nonenhancing (NE). Heterogeneous injury with HE and NE regions were identified in all patients. Dark NE regions in the LA wall on LGE-MRI demonstrate findings similar to the "no-reflow" phenomenon. Most of the scar at 3moPA came from NE tissue. These acute imaging findings may be useful for targeting optimal ablation locations.

VASCULAR DISEASE

Low Vitamin D Levels Associated With Arterial Stiffness and Vascular Dysfunction **186**

Ibhar Al Mheid, Riyaz Patel, Jonathan Murrow, Alanna Morris, Ayaz Rahman, Lucy Fike, Nino Kavtaradze, Irina Uphoff, Craig Hooper, Vin Tangpricha, R. Wayne Alexander, Kenneth Brigham, Arshed A. Quyyumi

Al Mheid and colleagues investigated the relationship between vitamin D levels and vascular function in humans. After adjustment for several clinical and laboratory variables, 25-hydroxyvitamin D was independently associated with flow-mediated vasodilation, reactive hyperemia index, and pulse wave velocity. In a subset of subjects with vitamin D insufficiency, normalization of 25-hydroxyvitamin D through supplementation improved several markers of vascular health, including mean arterial pressure. These findings suggest a link between low vitamin D levels, endothelial and smooth muscle cell function, and a higher risk for adverse cardiovascular outcomes seen in other studies.